Space Weather Forecast

Issued on Sunday, 15 October 2023 at 13:04 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1 Minor Storms, mainly day 2 and 4 (16/18 Oct).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only common class flares observed, the largest of which was from a small sunspot group in the northeast. There are six numbered sunspot regions. The most notable growth was from the small region in the centre disc, with some slight growth also been observed in a small group in the northwest, Otherwise, slight decay is evident in the southwestern most spot, and the small region in the south-centre disc. The other two regions, both in the northeast show little development.

One potentially Earth-directed CME (coronal mass ejection) was observed. This was associated with a 'filament eruption' north of one of the northwest sunspots at 14/1240UTC. This has the potential to give a glancing arrival on day 4 (18 Oct) either alongside, or combined with the previous CME which was observed earlier on 14 Oct. A further 'filament eruption' to the west of the main coronal hole on the disc occurred off the southwest disc. No associated coronagraph imagery is currently available to assess any resultant CME.

Solar Wind / Geomagnetic Activity: Previous coronal hole sourced fast winds continued to ease. Solar winds speeds declined from slightly elevated to be near background, from 500 km/s to around 400 km/s. The total interplanetary magnetic field (IMF) was weak with the north-south component also weak, but predominately positive (northward). Geomagnetic activity was Quiet to Unsettled (Kp 0-3). .

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low activity expected at first with only small and relatively simple sunspots on the visible disc. The main potential for increasing activity is from the sunspot in the central disc. Activity has the potential to increase later in the period as any new regions rotate onto the disc, with an increasing chance of M-flares.

Solar Wind / Geomagnetic Activity: There are two potential CME arrivals giving a glancing impact early on 18 Oct, likely combined as a single event. These are from the CMEs that occurred on 14 Oct. Otherwise, the main potential enhancement would be from the arrival of any faster wind from the main coronal hole on the disc, most likely later day 2-or early day 3 (16-17 Oct), although this is low confidence. Mainly Quiet geomagnetic activity is expected at first, but increasing to Unsettled to Active with a chance of G1 Minor Storms with any coronal hole fast wind connection or CME arrival, most likely day 2 or day 4 (16 or 18 Oct).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) are forecast to remain at background with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	40	20	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	30	30	40
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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